

CLAIMS

What is claimed is:

1. A process cartridge, which is mounted in a main body of an image forming apparatus to supply a toner to a developing roller to develop an electrostatic latent image which is formed on a photoconductive drum, comprising:

a drum cartridge in which the photoconductive drum is disposed in an exposed manner, the drum cartridge being mounted in a direction parallel to a longitudinal axis of the photoconductive drum with respect to the main body;

a toner cartridge in which the developing roller rotating in contact with the photoconductive drum is mounted in an exposed manner, the toner cartridge being mounted in the main body to be disposed opposite to the drum cartridge; and

supporting members mounted on both sides of the toner cartridge, and supporting and guiding the toner cartridge so that the developing roller moves linearly with respect to the photoconductive drum,

wherein the supporting members are stationary at predetermined positions of the main body, and a developing nip between the photoconductive drum and the developing roller is controlled as the toner cartridge is moved toward the photoconductive drum linearly with respect to the supporting members within a predetermined distance range.

2. The process cartridge of claim 1, wherein the supporting members comprise position determining units formed stationary at predetermined positions of the main body to secure the supporting members on the main body.

3. The process cartridge of claim 2, wherein each position determining unit comprises at least a pair of position determining holes formed on an upper side of the supporting members and position determining pins formed at predetermined positions of the main body to be inserted into corresponding ones of the position determining holes.

4. The process cartridge of claim 3, wherein one of the supporting members mounted on both sides of the toner cartridge is a waste toner container to contain a waste toner discharged from the drum cartridge.

5. The process cartridge of claim 1, wherein the toner cartridge comprises at least

two guiding shafts formed on both sides thereof, and the supporting members comprise guiding holes to guide the guiding shafts such that the developing roller of the toner cartridge is moved linearly along the length of the photoconductive drum.

6. The process cartridge of claim 5, wherein the guiding shafts respectively comprise rolling contact members to be inserted into the guiding holes.

7. The process cartridge of claim 1, wherein the toner cartridge comprises at least two guiding holes formed on both sides thereof, and the supporting members comprise guiding shafts to guide the guiding shafts such that the developing roller of the toner cartridge is moved linearly along the photoconductive drum.

8. The process cartridge of 7, wherein the guiding shafts respectively comprise rolling contact members to contain the guiding holes.

9. The process cartridge of claim 8, wherein each of the rolling contact members is a cylindrical bearing.

10. The process cartridge of claim 9, wherein one of the supporting members mounted on both sides of the toner cartridge is a waste toner container to receive and contain a waste toner discharged from the drum cartridge.

11. The process cartridge of claim 1, wherein the toner cartridge further comprises a flexible coupling to which a rotation force is transmitted from the main body even when the toner cartridge is moved together with the supporting members along the photo conductive drum.

12. The process cartridge of claim 11, wherein the flexible coupling comprises:
a coupling body connected to a driving source of the main body;
a coupling gear connected to a passive gear of the toner cartridge; and
a medium disc to transfer a power of the driving source and to cause the coupling gear to move by a predetermined distance in a radial direction of the medium disc.

13. An image forming apparatus comprising:
a main body having first and second cartridge mounting portions spatially

communicating with each other;

a drum cartridge removably mounted in the first mounting portion, and having a photoconductive drum exposed outward;

a toner cartridge removably mounted in the second mounting portion, and having a developing roller exposed outward, the toner cartridge being mounted without interruption between the developing roller and the photoconductive drum and contacting the photoconductive drum when completely mounted in the second mounting portion;

supporting members mounted on both sides of the toner cartridge to support and guide the toner cartridge so that the developing roller moves linearly with respect to the photoconductive drum; and

a pressing unit to maintain a predetermined developing nip between the photoconductive drum and the developing roller by pressing the toner cartridge toward the photoconductive drum when the toner cartridge is mounted in the second cartridge mounting portion.

14. The image forming machine of claim 13, wherein the supporting members comprise position determining units formed stationary at predetermined positions of the main body to secure the supporting members on the predetermined positions of the main body.

15. The image forming machine of claim 14, wherein each of the position determining units comprises at least a pair of position determining holes formed on an upper side of the supporting member, and position determining pins which are formed at predetermined positions of the main body to be inserted into corresponding ones of the position determining holes.

16. The image forming machine of claim 15, wherein one of the supporting members mounted on both sides of the toner cartridge is a waste toner container to contain a waste toner discharged from the drum cartridge.

17. The image forming machine of claim 13, wherein the toner cartridge comprises at least two guiding shafts formed on both sides thereof, and the supporting members comprise guiding holes to guide the guiding shafts such that the developing roller of the toner cartridge is moved linearly along the length of the photoconductive drum.

18. The image forming machine of claim 17, wherein the guiding shafts respectively comprise rolling contact members to be inserted into the guiding holes.

19. The image forming machine of claim 13, wherein the toner cartridge comprises at least two guiding holes formed on both sides thereof, and the supporting members comprise guiding shafts to guide the guiding shafts such that the developing roller of the toner cartridge is moved linearly along the length of the photoconductive drum.

20. The image forming machine of claim 19, wherein the guiding shafts respectively comprise rolling contact members to be inserted into the guiding holes.

21. The image forming machine of claim 18, wherein each of the rolling contact members is a cylindrical bearing.

22. The image forming machine of claim 21, wherein one of the supporting members mounted on both sides of the toner cartridge is a waste toner container to receive and contain toner discharged from the drum cartridge.

23. The image forming machine of claim 13, wherein the toner cartridge further comprises a flexible coupling to which a rotation force is transmitted from the main body even when the toner cartridge is moved together with the supporting members.

24. An image forming machine of claim 23, wherein the flexible coupling comprises:
a coupling body connected to a driving source of the main body;
a coupling gear connected to a passive gear of the toner cartridge; and
an media disc transferring a power of the driving source and causing the coupling gear to move by a predetermined distance in a radial direction of the medium disc.

25. A process cartridge mounted in a main body of an image forming apparatus to supply a toner to a developing roller to develop an electrostatic latent image formed on the photoconductive drum, comprising:

a drum cartridge mounted in the main body;
a toner cartridge having the developing roller communicating with the photoconductive drum, and slidably mounted in the main body in a direction parallel to a rotating axis of the

developing roller;

support members mounted on both sides of the toner cartridge to support and guide the toner cartridge in the main body so that the developing roller moves linearly with respect to the photoconductive drum;

a press unit moving the developing roller of the toner cartridge toward the photoconductive drum when the toner cartridge is slidably mounted in the main body;

a driving source; and

a flexible coupling unit flexibly coupling at least one of the developing roller and the photoconductive drum to the driving source.

26 The process cartridge of claim 25, wherein the toner cartridge further comprises a case containing the developing roller and having the both sides of the toner cartridge movably coupled to the corresponding ones of the support members.

27. The process cartridge of claim 26, wherein the case comprises one of a shaft and a hole formed thereon, and the support member comprises the other one of the shaft and the hole formed thereon.

28. The process cartridge of claim 27, wherein:

the main body comprises,

a groove,

a first position determining pin, and

a second position determining position;

one of the support members comprises,

a first portion having a first position determining hole which receives the first position determining pin; and

the other one of the support member comprises,

a second portion having a second position determining hole which receives the second position determining pin.

29. The process cartridge of claim 26, wherein the case comprises a step portion, and the press unit pushes the step portion of the case when the case is inserted into the main body, so that the developing roller of the case is pushed toward the drum cartridge.

30. The process cartridge of claim 26, wherein the case comprises first and second steps, and the press unit comprises first and second sub-press units corresponding to the first and second steps, respectively.

31. The process cartridge of claim 30, wherein the main body comprises a toner cartridge mounting portion having a surface defining a space accommodating the toner cartridge in a direction parallel to a rotation axis of the developing roller, and the first and second steps are arranged in the direction parallel to the rotation axis of the developing roller.

32. The process cartridge of claim 25, wherein the flexible coupling unit comprises: a driving gear rotatably mounted on the toner cartridge to rotate the developing roller, and having a connecting pin; and

a medium disc rotatably mounted on the toner cartridge, and having a plurality of slots into which the connecting pin and a shaft of the driving source are inserted into corresponding ones of the slots when the toner cartridge is inserted into the main body, to transfer a rotation force of the driving source to the developing roller through the medium disc and the driving gear.

33. The process cartridge of claim 32, wherein the flexible coupling unit further comprises a passive gear connected to the driving gear to rotate the developing roller according to a rotation of the driving gear.

34. A process cartridge mounted in a main body of an image forming apparatus to supply a toner to a developing roller to develop an electrostatic latent image which is formed on the photoconductive drum, comprising:

a toner cartridge having the developing roller and slidably mountable in the main body to communicate with the photoconductive drum;

a support member in which the toner cartridge is movably disposed, and supporting and guiding the toner cartridge in the main body so that the developing roller moves linearly with respect to the photoconductive drum while the support member is in a stationary state with respect to the main body; and

a press unit moving the developing roller of the toner cartridge with respect to the support member toward the photoconductive drum when the toner cartridge is mounted in the main body.

35. A process cartridge mounted in a main body of an image forming apparatus to supply a toner to a developing roller to develop an electrostatic latent image which is formed on the photoconductive drum, comprising:

a toner cartridge having the developing roller and slidably mountable in the main body to communicate with the photoconductive drum, and mounted in the main body; and

a support member in which the toner cartridge is movably disposed, supporting and guiding the toner cartridge in the main body, and being in a stationary state with respect to the main body while the toner cartridge is movable with respect to the main body.

36. The process cartridge of claim 35, wherein the main body comprises a driving source and a shaft receiving a rotation force from the motor, and the process cartridge further comprises:

a flexible coupling unit disposed on a side of the toner cartridge, and having a driving gear rotatably mounted on the toner cartridge to rotate the developing roller and having a connecting pin, and a medium disc rotatably mounted on the toner cartridge and having a plurality of slots receivable the connecting pin and the shaft of the driving source to transfer the rotation force of the driving source to the developing roller through the medium disc and the driving gear.

37. An image forming apparatus to supply a toner to a developing roller to develop an electrostatic latent image formed on the photoconductive drum, comprising:

a main body having first and second cartridge mounting portions fluidly communicating with each other;

a drum cartridge removably mounted in the first mounting portion and having a photoconductive drum exposed outward;

a toner cartridge removably mounted in the second mounting portion, and having a developing roller exposed outward, the toner cartridge being mounted without interruption between the developing roller and the photoconductive drum, and contacting the photoconductive drum when being completely mounted;

a support member to which the toner cartridge is movably connected, and supporting and guiding the toner cartridge to be inserted into the main body so that the developing roller moves linearly with respect to the photoconductive drum;

a press unit moving the developing roller of the toner cartridge toward the photoconductive drum when the toner cartridge is slidably mounted in the main body;

a driving source; and
a flexible coupling unit flexibly coupling at least one of the developing roller and the photoconductive drum to the driving source.

38. An image forming apparatus to supply a toner to a developing roller to develop an electrostatic latent image formed on the photoconductive drum, comprising:

a toner cartridge having the developing roller and slidably mountable in the main body to communicate with the photoconductive drum; and

a support member in which the toner cartridge is movably disposed, supporting and guiding the toner cartridge in the main body, and being in a stationary state with respect to the main body while the toner cartridge is movable with respect to the main body.